**Recommendations for worker protection from *B. Anthracis* when engineering controls are not in place**
***NOTE: EVERY worker should follow guidance for handling mail**

| Risk | Activity Performed | Respirator Type | Fit Test | Medical Clearance | Facility Evaluation | Worker Medical Evaluation | Prophylaxis (Doxy, PCN, or Cipro) | Controls |
|---|---|---|---|---|---|---|---|---|
| High risk | First responders to suspected act of biological terrorism with unknown conditions (agent unknown, aerosol generation or dissemination method unknown) | SCBA, Pressure-demand | X | X | Evacuate room, secure until investigation & decon complete | Instruct in symptoms of disease<br><br>Nasal swab only if evaluating exposure | YES**<br><br>D/C if not confirmed | Level A suit<br>RESTRICT ACCESS |
| High risk - | First responders to suspect biological aerosol release but no current aerosol, splash hazard present | SCBA. Pressure-demand | X | X | Evacuate room, secure until investigation, testing & decon complete | Instruct in symptoms of disease<br><br>Nasal swab only if evaluating exposure | YES**<br><br>D/C if not confirmed | Level B suit<br><br>RESTRICT ACCESS |
| Moderate risk | Environmental sampling where there is an exposure risk to B. anthracis, or responders to an item that can be bagged, no aerosol threat | PAPR with full-face piece and HEPA filters, quantitatively fit tested | X | X | Evaluation based on likely areas of contamination | Instruct in symptoms of disease<br>Nasal swab only if evaluating exposure | Yes**<br><br>D/C if not confirmed | Double Tyvek or Saranex Suit, hood, booties, fully taped .gloves<br><br>RESTRICT ACCESS |
| Low risk | Operating, working near, maintaining or cleaning high speed mail sorting equipment, workers emptying mail bags as usual duties | Respirator at least as protective as N95 half-face, P-Type if oil mist is present | X | X | Mail room evaluation only if suspect mail received | Instruct in symptoms of disease<br>Nasal swab if evaluating exposure | Yes* | Engineering Controls<br>Housekeeping Controls<br>Gloves<br>Consider disposable aprons and goggles<br><br>RESTRICT ACCESS |
| Low risk | Mail handlers hand sorting*** | N95 respirator | X | X | Mail room evaluation only if suspect mail received | Instruct in symptoms of disease,<br>Nasal swab if evaluating exposure | Yes* | Gloves<br><br>RESTRICT ACCESS |
| Negligible risk | Other workers handling occasional mail/general public | None | | | If triggered | | No | Hand Washing |

*Only workers in mailrooms that received mail from a mail facility positive for anthrax require prophylaxis. **Anthrax vaccination recommended.
***This recommendation may be based on a risk assessment. See Glossary

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**Countermeasures for Protecting Workers from Exposure to *Bacillus anthracis* in Work Sites Where Mail is Handled or Processed**

1**. Background**. Of the 17 total confirmed cases of anthrax, 10 have been inhalational (four resulting in death), and seven cutaneous. Seven of the inhalation cases were associated with United States Postal Service performing jobs to include the sorting and processing of mail. For at least one of these cases, no clear connection to the mail system has been identified. The seven cutaneous cases appear to be associated with exposure to a contaminated letter. No dose information is available for confirmed cases by either route of exposure. Although widespread surface contamination has been identified, the number of cutaneous cases remains surprisingly small. Nonetheless, it appears that postal employees are at increased risk for inhalational anthrax without specific risk factors identified other than an association with high speed mail sorting or emptying of mailbags. Of the seven postal employees confirmed to have inhalational anthrax, their usual duties included sorting, processing, and others are identified only as "workers." It appears that most cases were associated with two major postal facilities in the Northeast U.S., although there are exceptions to this. Therefore, the clear identification of workers at sufficient risk to warrant specific preventive measures remains unresolved. The Occupational Safety and Health Administration has not issued specific guidance as to risk reduction measures that must be implemented. They have issued recommendations for handling a suspicious letter. They have also provided a fact sheet and references to recommendations made by the Centers for Disease Control and Prevention.

2. **Vaccination**. Vaccination is a countermeasure typically chosen where there is a reasonable likelihood of exposure, an identified group at risk, and a vaccine whose benefits outweigh the risk to the individual. An effective vaccine is available to prevent exposed individuals from developing any form of disease associated with *B. anthracis* exposure. The Advisory Council on Immunization Practices currently recommends vaccine for:

*Persons who work directly with the organism in the laboratory. (Note that this did not generally apply to workers in Level B labs that might be tasked to plate the organism. It was intended for research facilities.)

*Persons who work with imported animal hides or furs in areas where standards are insufficient to prevent exposure to anthrax spores.

*Persons who handle potentially infected animal products in high-incidence areas, while incidence is low in the United States, veterinarians who travel to work in other countries where incidence is higher should consider being vaccinated.

*Military personnel deployed to areas with high risk for exposure to the organism.

Additional groups have been considered to be at risk for exposure related to a terrorist threat:

*Postal workers

*First/Emergency Responders

*Health Care Workers (from contact with spores on clothing, etc)

Vaccine is not currently available, and the number of individuals in these groups across the U.S. is quite large. It is not currently possible to identify sub-groups that may be at higher risk, except perhaps based on location.

3. **Prophylaxis**. Antibiotic prophylaxis with ciprofloxacin, or doxycycline has been recommended for first responders and environmental samplers as an additional countermeasure. Currently, these individuals would take the antibiotic prior to the event, if possible, and continue until the presence of *B.anthracis* has been ruled out, up to 60 days post exposure. Post exposure antibiotics have also been recommended for individuals working near confirmed sources of contamination with *B. anthracis.* As of 9 November 2001, there were 32,000 individuals on prophylaxis. Post-exposure prophylaxis may present problems with compliance or adverse events. Of approximately 1000 individuals prescribed ciprofloxin in Florida, only 80% were still taking it at two weeks post exposure. 19% reported side effects such as itching, swelling or difficulty breathing. Six sought medical attention but none had a significant adverse event attributable to the medication.

4. **Hazard Controls**. When an uncontrolled hazard is present, a hierarchy of controls can be instituted to decrease or eliminate risk. This hierarchy, in order of importance, consists of: engineering controls, administrative and housekeeping controls, and personnel protective equipment and measures. Controls in each of these categories have been identified to reduce the risk of exposure to *B. anthracis.* Per the guidance from the CDC, these controls should be initiated after an evaluation of the work site. The evaluation should focus on the processes, operations, jobs or tasks that would be most likely to result in an exposure should a contaminated envelope or package enter the work site. As yet, there is no definitive way to identify facilities or locations where risk is absent, and most of the processes associated with exposure (mail sorting, emptying mail bags, hand sorting) are conducted in all mail facilities. Therefore, unless it is possible to rule out the possibility that exposure is reasonably anticipated, these controls to protect workers who handle mail in mail facilities should be implemented uniformly. One logical factor to consider in risk assessment is the probability or opportunity for exposure. This might differentiate those who handle mail all day as their principle duty, versus those who do it occasionally such as pick up and distribution in a building. See “Risk Assessment” in glossary.

5. **Engineering Controls.** High-speed mail sorting machines have been identified as a source of aerosol generation. If a contaminated letter passes through such a machine, the potential exists to expose workers in and near the machinery and the air-handling system to aerosols. Engineering controls provide the best means of preventing exposures. Those currently recommended include:

*Industrial vacuum cleaners with high efficiency particulate filters to clean machinery

*Local exhaust of pinch rollers

*HEPA filter exhaust hoods in areas where dust is generated

*Laminar flow air curtains in areas where large amounts of mail is processed
*HEPA filters in the air handling system
Machinery should not be cleaned with compressed air

6. **Administrative Controls.** These are procedures and policies that reduce risk. Implementing the basic guidance regarding handling suspicious mail, hand washing after mail handling, limiting access to mail sorting areas and the mailroom is recommended. Emptying of mailbags might be done in an area away from most mailroom traffic. Additionally, implementing the housekeeping controls such as wet mopping and HEPA vacuuming will reduce the spread of spores.

7. **Personal Protective Equipment (PPE)**. PPE is recommended when other controls are not in place and residual risk remains. Although well-selected and well-fitted PPE can be highly effective in reducing a workers risk, it is not infallible and thus is the least desirable control method. Additionally, the use of PPE typically causes some limitations in work efficiency, and is associated with increased medical surveillance costs, logistical burden, etc. The CDC has identified several groups who are at particular risk for exposure to inhalational and/or cutaneous anthrax and has made recommendations for PPE. (See attached table)

*All workers who handle mail: Protective impermeable gloves, hand washing. (Consider long pants and sleeves)
*First Responders. Although there are some specific details, the general recommendation for a first responder to an uncharacterized exposure is LEVEL A, which is a full suit with a self-contained breathing apparatus. As a situation is better characterized, these recommendations change.
*Environmental Samplers. Recommendations are a double Tyvek/Saranax suit with booties, hood, gloves and a full-face, powered air-purifying respirator with HEPA filters quantitatively fit tested.
*Individuals working with or near machinery capable of generating aerosolized particles (e.g. electronic mail sorters) or other work sites such as where mailbags are unloaded or emptied. Per the CDC, persons who hand sort mail "may also be exposed through inhalation." Those who hand sort mail were initially considered lower risk (CDCCHAN-0045-01-10-24-ADV-N) than those who work near high speed sorting equipment and therefore, the respiratory recommendations were different. (See glossary for "Risk Assessment") They are currently grouped together, and a fitted, NIOSH-approved respirator at least as protective as an N95 is recommended. A P-type filter is recommended if oil mist is present. Disposable aprons or goggles may be added.
*Laboratory workers. No new recommendations have been made regarding these workers, but CDC/NIH recommends BSL2/3 practices and Class II or III Biosafety cabinet, depending on the procedures performed and potential for aerosolization.

## Glossary/explanations/references

1. **High Risk Activities/Locations**:
   Suspicious package received [A]
   First responders to suspected act of biological terrorism of unknown parameters [B]
   High threat based on intelligence (location, specific individuals)
   Environmental sampling yields anthrax spores or culture positive
   Personnel with nasal swabs positive for anthrax indicating exposure

2. **Moderate risk Activities/locations**
   First responders responding to a release of an unknown biological agent from a letter or package that can be easily bagged; an aerosol-generating was not used to generate high airborne concentrations[B]
   Individuals conducting sampling to assess risk[F]
   "Down flow" post office that received mail from mail facility (Brentwood facility[D]) where anthrax present.

3. **Low risk**
   Mail handler working with or in vicinity of high-speed sorter[C]
   Maintenance/housekeeping personnel in facility with high-speed sorter[C]
   Mailbag unloading/emptying with possible particle generation[C]
   Mail handlers hand-sorting[C]
   Laboratory worker with recommended BioSafety Practices and equipment[E]

4. **Negligible risk**
   All workers not otherwise classified

5. **Risk Assessment for Hand Sorting of Mail: Factors to Consider**
   Engineering controls in place
   Down-flow from high-speed sorters
   Dumping of mail bags
   Geographical location of facility
   Size of facility
   Ventilation in facility
   Volume of mail sorted
   Hours per day performing this duty

References.


A. CDC Health Advisory, CDCHAN-00047-01-10-27-ADV-N, 27 Oct 01, Updated Recommendations for Handling Suspicious Packages or Envelopes.
B. CDC Health Advisory, 25 Oct 01, Interim Recommendations for Firefighters and Other First Responders for the Selection and Use of Protective Clothing and Respirators Against Biological Agents.

C. CDC Health Advisory, CDCHAN-00051-01-10-31-ADV-N, 31 Oct 01, Official CDC Health Advisory: CDC Interim* Recommendations for Protecting Workers from Exposure to *Bacillus anthracis* in Work Sites Where Mail is Handled or Processed
D. CDC Health Update, CDCHAN-00048-01-10-27-UPD-N, 27 Oct 01, Update: CDC Statement Regarding Postal and Other Mailroom Facilities in the Metropolitan Washington, DC Area.
E. CDC/NIH Biosafety in Microbial and Biomedical Laboratories, 4th edition.
F. CDC. Protecting Investigators Performing Environmental Sampling for *Bacillus anthracis*: Personal Protective Equipment

**Administrative Controls.** Risk reduction measures implemented through policies and procedures, strategies to limit the number of persons working at or near sites where aerosolized particles may be generated (e.g., mail-sorting machinery, places where mailbags are unloaded or emptied), restrictions to limit the number of persons in areas where aerosolized particles may be generated.

**Credible threat**. A suspect letter or package as per A above, opened or unopened or other potential aerosol source of anthrax.

**Down-flow post office**. Post office facility receiving mail directly from the Brentwood facility where two workers were diagnosed with inhalational anthrax. This definition is subject to change to include other facilities. See "D" above.

**Engineering Controls**. See "C" above. These include HEPA filter industrial vacuums, for cleaning mail-sorting equipment, HEPA filter exhaust hoods for sorting or for high-speed mail handling equipment, local exhaust at pinch roller areas, air curtains with laminar flow where large amounts of mail are processed, and HEPA filters in the building ventilation system. NOTE that adequate engineering control is the preferred method of addressing a hazard and will result in lower risk and less dependence on personal protective equipment.

**Facility evaluation**. Sampling for B*. anthracis* according to a sampling plan.

**Fit Test/Medical Clearance**. Individuals required by an employer to wear a respirator must be enrolled in a respiratory protection program that complies with the provisions of OSHA 29 CFR 1910.134. This includes medical clearance to wear the respirator, and fit testing to ensure that the respirator fits properly. If a respirator is not required by an employer (i.e., the employer does not believe the risk is significant enough to require a respirator) but the employee voluntarily elects to wear a respirator, and the employer permits this, these individuals would be considered as voluntary users. OSHA regulation requires only that Appendix D of their respiratory protection regulation be given to voluntary users of filtering facepiece respirators that the employer permits them to use. When an employer permits the use of voluntary use of other than filtering facepiece respirators, e.g., elastomeric respirators, OSHA requires the employer to

establish and implement only those elements of a written respirator protection program to ensure employees are medically cleared to wear the respirator and that the respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user

**Gloves.** The choice of glove material (nitrile, vinyl) should be based on safety, fit, durability, and comfort. Gloves can be worn under heavier gloves (leather, etc) if more protection against hand injury is needed. Latex gloves should be avoided because of the risk of developing skin sensitivity or allergy. See "C" above for a lengthy discussion.

**HEPA filter**. High-efficiency particulate air filter.

**Housekeeping.** Dry sweeping and dusting should be avoided. Instead, areas should be wet-cleaned and vacuumed with HEPA equipped vacuum cleaner.

**Nasal swab**. A test performed by swabbing the nostrils, sent for culture to determine the presence of B*. anthracis*. A positive nasal swab indicates exposure, not infection. Infection is diagnosed by blood culture. Typically used in an epidemiological investigation to determine the extent of exposure.

**Recommended respirators**. See chart or reference C for further discussion.

**SCBA.** Self contained breathing apparatus. See 'C' above for further details.

**Triggered evaluations**. Facility evaluations are "triggered" by a number of events. See the discussion of "high risk" above.

**Prophylaxis.** Both Doxycycline and Ciprofloxacin noted to be equally effective based on antibiotic sensitivities done on the Anthrax found in New York.